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BRAKING MEANS FOR MOBILE DEVICES

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FIG. 1

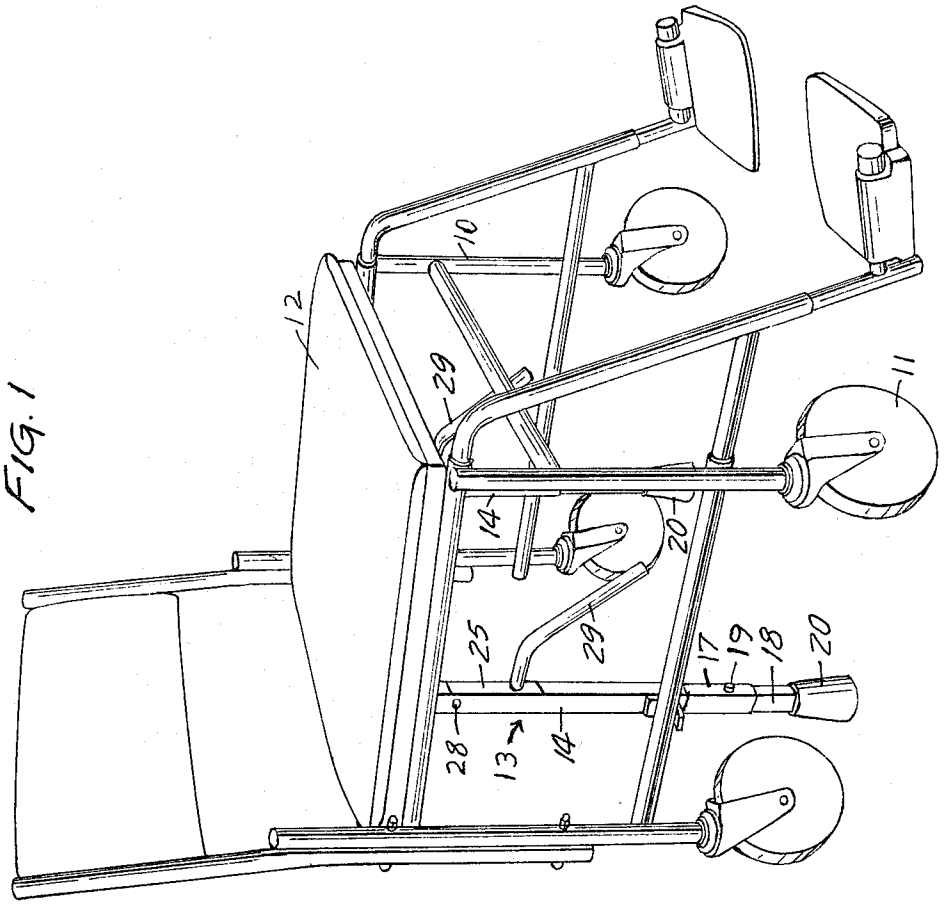
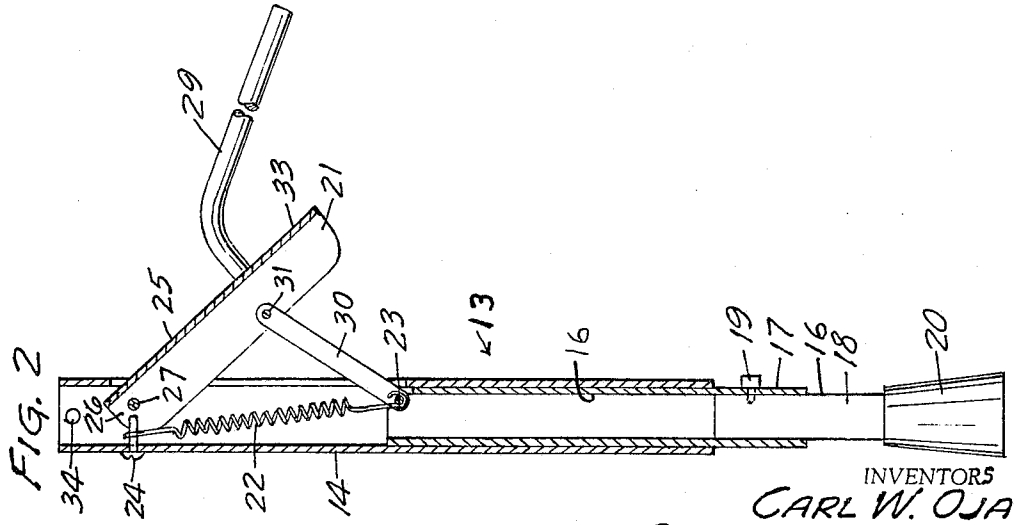


FIG. 2



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This invention relates to new braking means, and particularly to mobile devices equipped with the novel means of the invention for braking against movement.

The invention provides specialized braking means wherein the control for braking may be positioned for the convenience of the user. The control for braking is easily operated, and is manually operated. It requires so little strength and movement that many invalids and infirm individuals, who retain some control over their arm movements, are quite capable of effecting the braking operation quickly, or releasing the braking condition quickly, without the discomfort of undue movement or strain.

A particularly novel feature of the manual braking means of this invention is that with respect to the toggle mechanism. Ordinarily, one would expect that a toggle mechanism for the extension of telescoping members would be pivotally attached externally to each telescopically engaged part. In the case of the instant invention, however, the toggle mechanism is pivotally attached internally to each telescopically engaged part. Such attachment permits the toggle control for braking to be located at any desired point along the length of the outermost member of the telescopically engaged parts. This feature is important in connection with mobile hospital and rehabilitation equipment (such as mobile chairs, stretchers, tables and other articles) which infirm and invalid persons need, and which they like to brake from movement over a floor by themselves. The feature is particularly vital in the case of mobile invalid chairs.

The invention will be described by reference to a drawing, wherein:

FIGURE 1 is a schematic perspective view of a mobile chair having two braking means according to the invention, one mounted on each side of the chair; and

FIGURE 2 is a cross-sectional longitudinal view of braking apparatus according to the invention.

As illustrated in the drawing, the mobile device or chair has a frame **10** mounted on wheels **11**. Customarily, at least three wheels are used. The wheels may be any suitable size, smaller wheels being sometimes called casters. A platform, suitably a chair seat **12**, is supported on the frame in elevated condition in relationship to the wheels **11**. Braking means **13**, preferably two complete assemblies of braking apparatus, is located beneath the platform and attached or mounted on the frame by any suitable means such as screws, bolts, flanges, clips and the like.

The braking apparatus **13** includes a tubular element **14** which is hollow in character and constitutes the outermost member of telescopically engaged parts. It is mounted and oriented on the frame of the mobile device in an essentially vertical orientation to (or in an essentially perpendicular relationship to) a plane through the wheels of the mobile device. The lower terminus of tubular element **14** is spaced from the surface supporting the wheels of the device so as to accommodate below that terminus the projecting parts of internally telescoping plunger **16** and associated elements (including a braking foot **20**). Suitably, the spacing is from 2 inches up to 8 or 10 inches (5 to 20 or 25 centimeters). This spacing varies depending upon the nature of the mobile device to which the braking means is attached and the movement required or desired for the plunger **16** and associated elements.

Plunger **16**, which is telescopically engaged within the lower end of tubular element **14**, is normally withdrawn from the surface supporting the wheels of the device so as to permit free rotation of the wheels and free mobility for the device. Plunger **16**, however, is adapted to be extended downwardly from the tubular element to engage the surface supporting the wheels of the device and thereby brake the device against movement. Preferably, plunger **16** is adjustable in length so as to permit adjustment of braking contact of its end. To gain adjustability, plunger **16** comprises a holding member **17** which extends telescopically within tubular element **14**, plus a leg **18** held by set screws **19** in fixed relationship to the holding member **17**. The end of leg **18**, which is adapted to engage a floor or other surface, may be provided with a friction element such as a rubber foot or cap **20**. It should be understood that position of leg **18** in holding member **17** is such that leg **18** (in combination with any cap **20** on its end) contacts and also asserts pressure against a floor (or other surface) supporting the wheels of the device. This correct position for leg **18** to accomplish braking is first determined after mounting the braking apparatus on a mobile device; and then the set screw (or other means to fix the elements of plunger **16** in rigid relationship) is fastened to hold the leg **18** and holding member **17** in rigid relationship.

A toggle mechanism **21** (shown in outwardly pivoted position for clarity in FIGURE 2) is used to extend the plunger **16** downwardly from tubular element **14** and to retract it from its extended condition. In the outwardly pivoted position for the toggle mechanism, the plunger **16** is retracted from its extended condition so that the friction element **20** is not in contact with a floor or other supporting surface for wheels of a device.

Means **22**, suitably a coil spring, extends from a pivot point **23** (a pin or shaft) in plunger **16** to a means such as a screw **24** located upwardly from plunger **16**. The means **22** biases the plunger **16** in a retracted condition from a floor or other supporting surface. Means alternative to a spring (e.g., weights, including reliance upon the weight of pivotable toggle means and the weight distribution thereof during toggle operation) may be used to bias the plunger in a retracted position from a floor or other supporting surface.

Some very significant features of the braking means will now be emphasized. One of the arm means of the toggle mechanism includes a longitudinal segment **25** out of tubular member **14** and extending along one side of the tubular member **14**. This longitudinal segment **25** is separate from the tubular member; and it may comprise a segment of one complete side of a square tubular member. One end of this longitudinal segment is equipped with a flange extension **26** extending inwardly from the segment so that the flanged extension is located within tubular member **14**. An inward flanged extension **26** is suitably on each lateral side of one end of the segment **25**, and perpendicular to the segment **25** out of a square tubular member. A pin **27** extends through the flanged extension (or extensions), and journals on a bearing surface in the walls of tubular member **14**. The pin **27** for pivot of arm **25** may suitably be affixed in the walls of tubular member **14** by a nut **28** (see FIGURE 1) on each end of the pin. Segment **25** is equipped with a handle member **29** attached externally to the segment. Handle **29** may be gripped by a person to pivot the segment **25** outwardly from the tubular member into a non-braking position (as illustrated in FIGURE 2), and return segment **25** to a position flush with the tubular member for braking (as illustrated in FIGURE 1). The braking position illustrated in FIGURE 1 presents a neat uniform

appearance with the segment **25** essentially flush with the surrounding surface of the tubular member **14**.

The other of the arm means of the toggle mechanism includes at least one connecting rod **30** (preferably two connecting rods for added strength), extending from a toggle pivot pin **31** on the toggle arm segment **25** to lower arm pivot pin **23** journaled in bearing recesses of plunger **16** (that is in wall portion of hollow holding member **17** of plunger **16**). Note that the pivot connection of arm **30** to plunger **16** is at a location on the plunger which remains within the tubular element **14** during both extremes of movement of the plunger as effected by the toggle mechanism.

Observe that the segment **25**, which serves as one arm of the toggle mechanism, has an extension or tail end **33** beyond toggle pivot **31**. This extra end **33** serves to cover the portion of the opening in tubular member **14** needed for effective toggle operation of arm **30** as it moves out of the confines of the tubular member **14** to withdraw plunger **16** from contact with a floor.

Means such as a hole or aperture **34** (see FIGURE 2) is useful to attach the braking means to a frame of a mobile device.

It should be recognized that the braking position (the closed position illustrated in FIGURE 1) for the toggle mechanism causes pivot shaft **31** to be located laterally inward from a plane or line passing through pins **23** and **27** of the toggle arms. In other words, toggle pin **31**, in the closed braking position, occupies a position which is laterally inward from a plane through pivot shafts **23** and **27**; and toggle pin or shaft **31** occupies a position laterally outward from a plane through pivot shafts **23** and **27** when the toggle mechanism is in open or non-braking condition (as illustrated in FIGURE 2). The inward lateral displacement of toggle pin **31** in the braking condition is opposite to that outward lateral displacement for toggle pivot **31** in the non-braking condition (shown in FIGURE 2). During braking, toggle pivot **31** moves through the plane extending through pins **23** and **27** and comes to rest at an inward location displaced laterally from the plane through pins **23** and **27**. Thus, braking condition is maintained until positive action is taken to displace the toggle mechanism and move pivot pin **31** to the outward position shown in FIGURE 2.

Preferably tubular member **14** is a square tube (or an essentially square tube) instead of a round one; and the plunger **16**, particularly its tubular or top member **17**, is also preferably essentially square so as to mate snugly and telescopically with the outer member **14**.

If desired, elements of the braking apparatus may be duplicated in whole or in part. For example, leg **18** may be equipped with lateral extensions holding laterally positioned legs; and the lateral legs may be equipped with friction caps **20**. Also, if desired, the elements of the device may be reversed in position and used in braking.

In operation, as the handle **29** of the toggle mechanism is displaced downwardly from its FIGURE 2 position, segment **25** closes the opening of tubular element **14** and the toggle pivot **31** passes through a plane common to arm shafts or pins **23** and **27** to a position laterally inward and opposite to the laterally outward position the toggle pivot occupies in the open non-braking condition shown in FIGURE 2. The closing of segment **25** serves to extend or distend the arms of the toggle mechanism, and to extend plunger **16** downwardly so that the friction element **20** bears with some pressure against a floor and brakes movement.

That which is claimed is:

1. A mobile device having a frame mounted on wheels, a platform supported on the frame in elevated condition in relationship to the wheels, and braking means located beneath said platform and mounted on said frame, said braking means comprising at least one assembly of elements including a tubular element oriented essentially vertically in relation to a plane through the wheels of said mobile device, said tubular element being spaced from the surface supporting the wheels of said device, a plunger telescopically engaged within the lower end of said tubular element and normally withdrawn from the surface supporting the wheels of said device but adapted to be extended downwardly from said tubular element to engage with said surface, a toggle mechanism for extending said plunger downwardly from said tubular element and retracting said plunger from its extended condition, and biasing means within said tubular element for biasing said plunger in a retracted condition from the surface supporting the wheels of said device, said tubular element having an elongated essentially vertical opening along one side thereof, one of the arm means of the toggle mechanism including a longitudinal segment out of said tubular element along one side thereof at said opening and separated therefrom, with a flange extension inwardly from one end of said segment pivotally connected to said tubular element and a handle member attached externally to said segment to permit said segment to be pivoted outwardly from said tubular element into a non-braking position and returned thereto for braking, the other of the arm means of said toggle mechanism including at least one connecting rod pivotally attached to said plunger at a location on said plunger which remains within said tubular element during both extremes of movement of said plunger as effected by said toggle mechanism, the pivot between said arm means of said toggle mechanism being within said tubular element when said plunger is in said extended condition.

2. A mobile device as in claim **1** wherein the tubular element and the telescopingly engaged plunger of the braking means are essentially square in cross section.

3. A mobile device as in claim **1** wherein the longitudinal segment of said one of the arm means of the toggle mechanism is equipped with a flanged extension inwardly of each lateral side of the longitudinal segment, and each said inwardly flanged extension is pivotally connected to the tubular element therewithin.

4. A mobile device as in claim **1** having at least two braking means mounted on its frame.

5. A mobile device as in claim **1** wherein the plunger of the braking means is adjustable in length.

6. A mobile device as in claim **1** wherein the plunger of the braking means is equipped with a friction foot element adapted, for braking, to be placed in pressure engagement with the surface supporting the wheels of the mobile device.

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